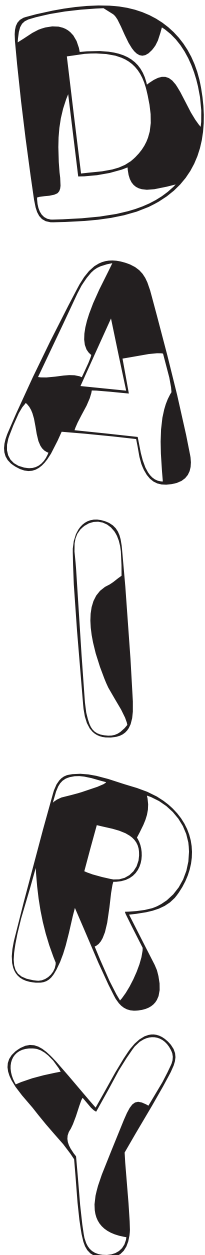
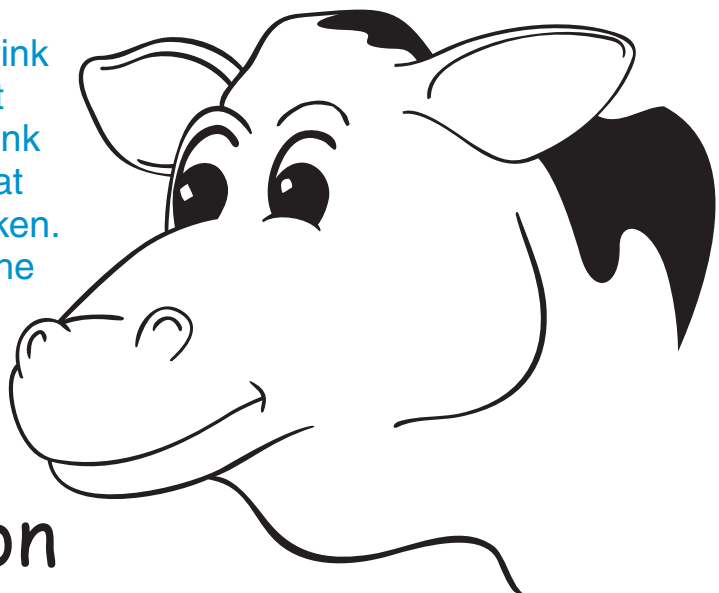




From Moo to You



The next time you drink a glass of milk or eat cheese or yogurt, think about the journey that dairy product has taken. How did it get from the cow to you?

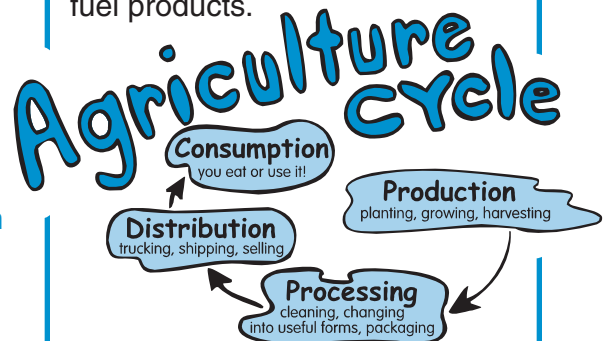


Dairy Production

Incredible Dairy Facts

- All cows are female, and only cows produce milk. The males are called bulls.
- A cow produces milk after she has given birth to a calf. She can have her first calf when she's about 2 years old.
- Milk is measured in pounds, and the average U.S. cow produces about 55 pounds (110 cups) of milk each day. That's 113,000 pounds (226,000 glasses) of milk in her lifetime – enough to fill the average classroom more than 2 feet deep with milk.
- Holsteins are one breed of dairy cattle. A Holstein cow's spots are like a fingerprint. No two cows have exactly the same pattern of spots.

Agriculture! It's farming and ranching and much more. It's the production, processing, distribution and consumption of our food, fiber, forestry and fuel products.



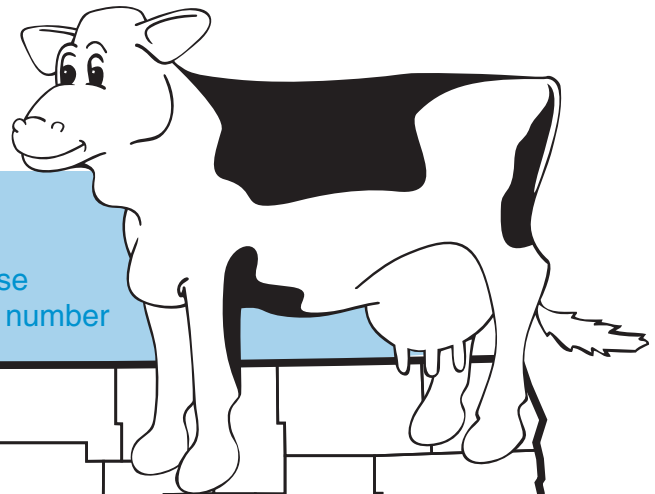
Moo Math

1. Even cows need a break. A cow can produce milk for about 305 of the 365 days in a year. If she produces 110 cups of milk per day, how many cups does she produce in 305 days?

2. Many of us buy milk in gallon jugs. How many gallon jugs can that cow fill in a day? _____
3. Before milking machines were invented in 1894, a farmer could milk 6 cows per hour by hand. How long would the milking take if the farmer had 15 cows? _____
4. Farmers can now milk a cow in about 5 minutes with a milking machine. If a farmer has 6 milking machines going at once, how many cows can be milked in one hour? _____
5. There are about 9 million milk cows in the U.S. today, and about 90% of them are of the black and white Holstein breed. How many U.S. cows are Holsteins? _____

Eating Right

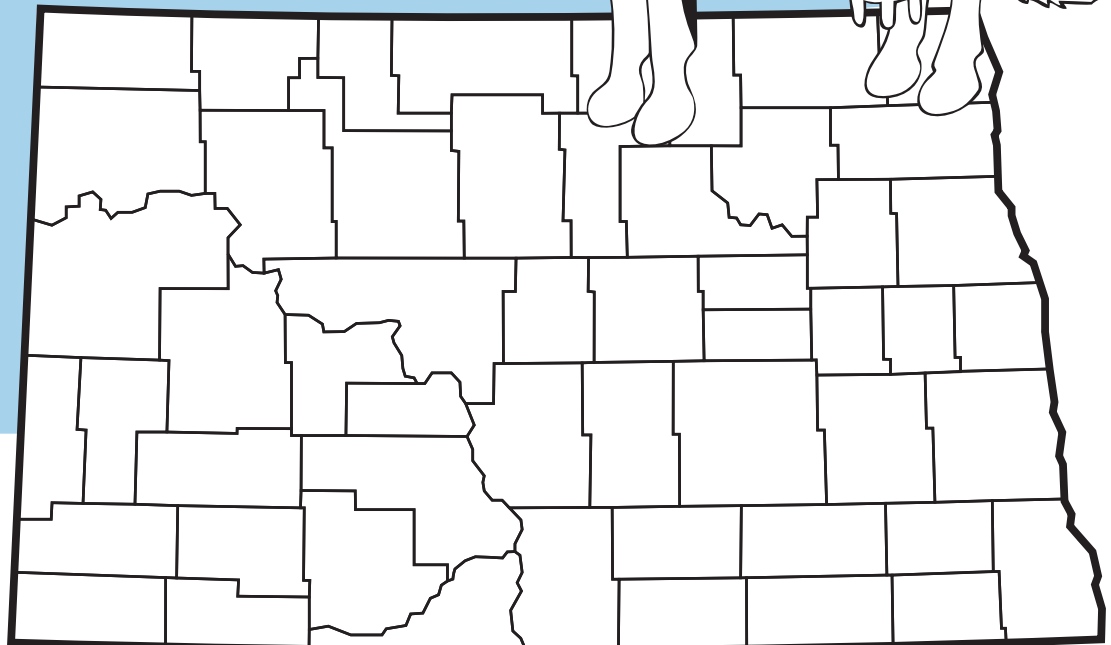
Cows eat grass, hay and grains such as corn, and they drink lots of fresh water. The cow's body uses this feed and water to make milk. A well-fed cow produces more than 25 pounds (55 cups) of milk in one milking if she's milked twice a day. If a cow eats only grass, she produces only about 13.3 pounds (24 cups) of milk in one milking. So you see, good nutrition pays off for cows as well as people!



North Dakota's Dairy Cows

Dairy cows can be found across North Dakota. Use this map to identify the state's top 10 counties for number of dairy cows.

1. Morton
2. Emmons
3. Stark
4. Sargent
5. Stutsman
6. McHenry
7. Oliver
8. McIntosh
9. Nelson
10. Logan



North Dakota's 207 dairy farms have 26,000 dairy cows that produce 418 million pounds of milk annually.

Dairy Processing

At the Processing Plant

Milk samples are tested in a lab to ensure that only the purest milk is used. The milk is *homogenized* to break the butterfat particles into thin, uniform globules. If milk wasn't homogenized, the cream would rise to the top so you would have to shake or stir the milk before serving.

The milk is then *pasteurized*. That means it's heated to 161 degrees F for 15 seconds to kill bacteria, then rapidly cooled to prolong shelf life.

Milk packaged for drinking has Vitamin D and Vitamin A added, and some also has flavor added to make delicious chocolate milk. Packaging machines fill and seal the cartons or jugs.

Almost half the milk produced in the U.S. is made into more than 200 different types of cheese.

List the different kinds of cheese you know.

List other dairy products you're familiar with.



Find the Real Seal on genuine dairy products at home.

How Much Milk Does It Take?

A tall, cool glass of milk isn't the only way to get milk's vitamins and calcium. You can get them in all kinds of different dairy products.

How many cups of milk does it take to make each of the products listed below? Draw a line from the food to your guess.

1 pound butter

8 ounces yogurt

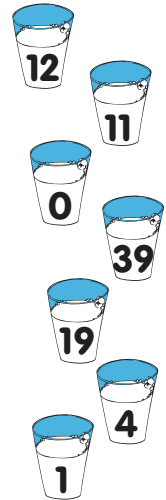
1/2 gallon ice cream

1 dozen eggs

1 pound cottage cheese

1 pound American cheese

2 cups evaporated milk



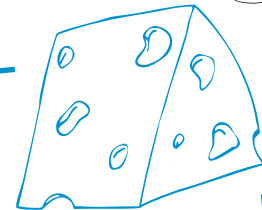
Say Cheese!

To make cheese, milk is heated and mixed with a *culture*. Cultures contain different types of good bacteria that give various cheeses their distinct flavors, textures and colors. The culture makes the milk curdle, clumping the milk's proteins together to form lumpy curds and liquid whey. (Remember Little Miss Muffet's snack?)

The whey is drained from the curds. You can eat the curds as fresh cheese, or you can wait until the curds are aged.

The kind of milk used, the amount of fat in the milk, how the curds and whey are formed, and how the cheese is stored also account for different colors and tastes. Even the sizes and shapes of cheeses are different.

Visit www.ilovecheese.com to learn all about cheese, especially the different kinds of cheeses and the history of cheese.



Career Corner

Jason Eckert — Vice President of Quality, Leprino Foods

The next time you have Pizza Hut, Domino's or Papa John's pizza, you can thank a North Dakotan for the delicious cheese on top.

Jason Eckert is vice president of quality for Leprino Foods in Denver, Colorado. His job is to make sure all the company's products are safe and meet the customers' requirements. He is responsible for sanitation, pest control, policies and procedures, working with government regulators and developing quality standards in the company.

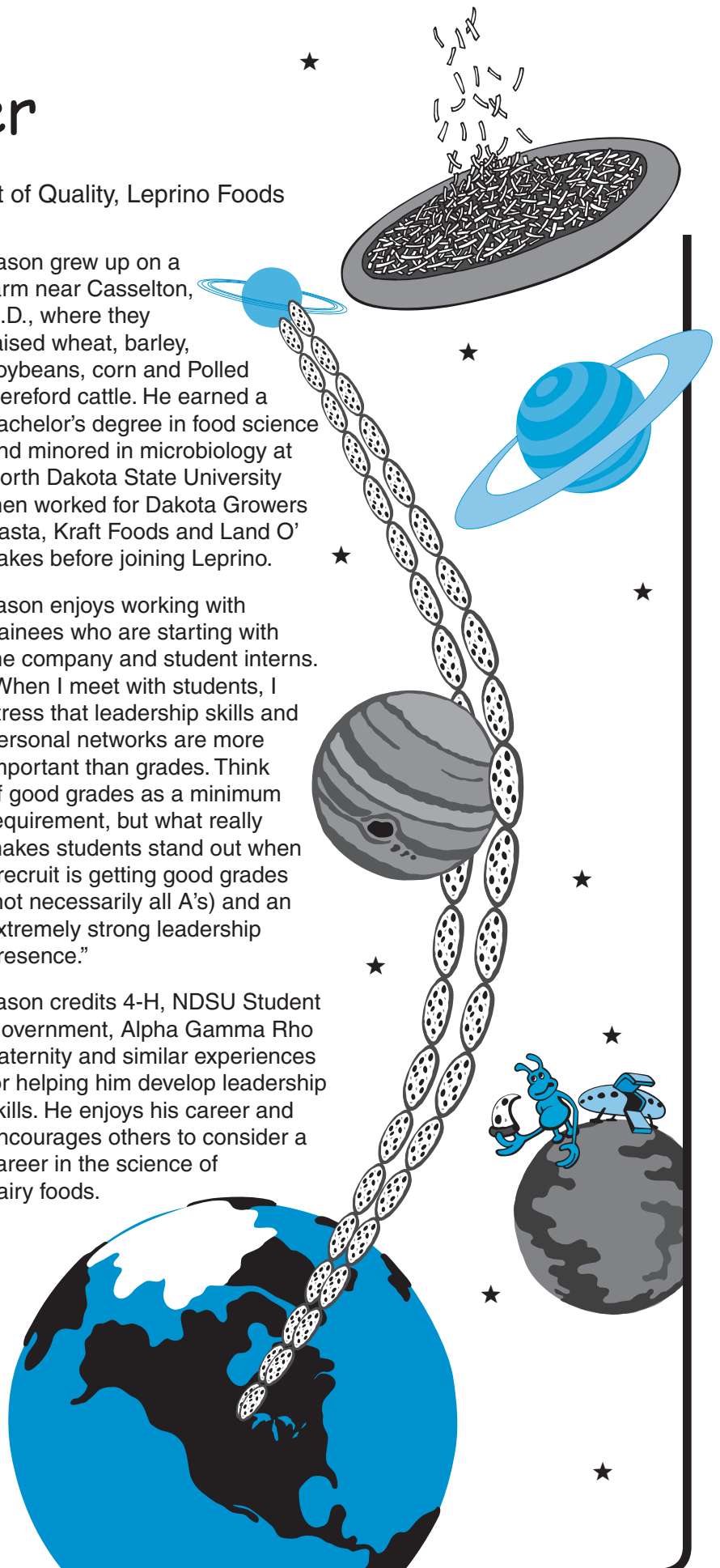
"We supply 100% of the cheese to Pizza Hut, Domino's and Papa John's in North America," Jason says. "We also supply several manufacturers, such as Nestle (Hot Pockets), Heinz (Stouffers and Lean Cuisine), Schwan's (the #1 supplier of pizza to schools), Schreiber Foods (Chuck E. Cheese string cheese) and a variety of food distributors that send our products to restaurants across the country. Additionally, if you go into your local grocery store and buy their brand of shredded mozzarella, most likely you are eating Leprino cheese. Odds are very high that most people eat our cheese at least two or three times per week."

Leprino makes about 1.5 billion pounds of cheese per year. All that cheese would make about 4 billion pizzas a year. If laid side by side, the pizzas would be 3 billion miles long, the distance to Uranus and back.

Jason grew up on a farm near Casselton, N.D., where they raised wheat, barley, soybeans, corn and Polled Hereford cattle. He earned a bachelor's degree in food science and minored in microbiology at North Dakota State University then worked for Dakota Growers Pasta, Kraft Foods and Land O' Lakes before joining Leprino.

Jason enjoys working with trainees who are starting with the company and student interns. "When I meet with students, I stress that leadership skills and personal networks are more important than grades. Think of good grades as a minimum requirement, but what really makes students stand out when I recruit is getting good grades (not necessarily all A's) and an extremely strong leadership presence."

Jason credits 4-H, NDSU Student Government, Alpha Gamma Rho fraternity and similar experiences for helping him develop leadership skills. He enjoys his career and encourages others to consider a career in the science of dairy foods.



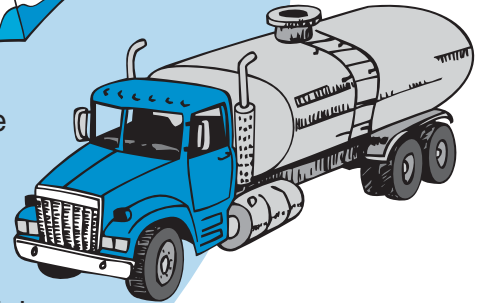
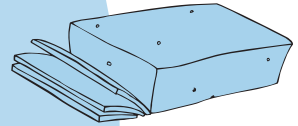
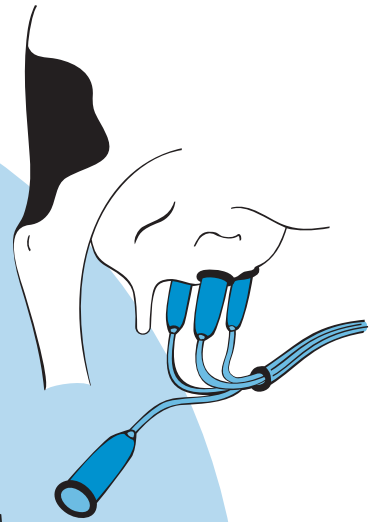
Dairy Distribution

Milk is processed and distributed quickly so it's fresh when you buy it. The milk that arrives at the store today was milked from cows just two days ago.

The Journey of Milk

Milk travels through many steps from the farm to your table. Think about milk production, processing, distribution and consumption to number these steps 1-9 in the order in which they happen.

- ___ The milk is tested for quality and homogenized and pasteurized if it's to be sold as liquid milk.
- ___ Cows are housed in comfortable barns and milked 2 or 3 times each day.
- ___ You enjoy the taste and nutrition of dairy foods.
- ___ Some of the milk is processed into cheese, yogurt, ice cream and other dairy products.
- ___ The milk is transported in a refrigerated tanker truck to the processing plant.
- ___ The dairy products are delivered with refrigerated trucks to stores, schools and restaurants.
- ___ Cows eat nutritiously, drink lots of water and receive special care from their farmer-owners so they can produce milk.
- ___ You purchase dairy products at the store, at school or at a restaurant.
- ___ The milk is pumped into a refrigerated storage tank on the farm.



Cheese Around the World

More than half of the milk produced in North Dakota is made into cheese. Many cheese varieties originated in Europe. On a world map, find the continent of Europe. On this European map, write the names of the countries where these cheeses originated.

- Mozzarella, Provolone, Parmesan – Italy
- Brie, Camembert – France
- Feta – Greece
- Cheddar – England
- Swiss, Gruyère – Switzerland
- Havarti – Denmark
- Jarlsberg – Norway
- Gouda, Edam – The Netherlands
- Limburger – Belgium

Dairy Consumption

Are You Calcium Smart?

Your body needs calcium for strong bones and teeth. The best way to get calcium is from milk and other dairy foods. MyPyramid for Kids at www.mypyramid.gov says you need



Milk Group

Get your calcium-rich foods

3 servings of dairy each day. One serving equals 1 cup of milk or yogurt, 2 ounces of cheese, or 1/2 cup of cottage cheese, pudding, ice cream or frozen yogurt.

List the foods you ate from the milk group today and yesterday.

Got Milk?

Take a look at the nutrients in dairy products and what they do for you.

Calcium – helps build strong bones and teeth

Magnesium – involved in building bones, building muscles and muscle movement

Phosphorus – a major part of bones and teeth

Potassium – regulates water balance in your body and blood pressure

Protein – helps build strong muscles

Riboflavin – helps change food to energy

Vitamin B12 – builds red blood cells that carry oxygen to muscles

Vitamin D – helps your body use calcium to build strong bones and teeth



What's in Those Cartons?

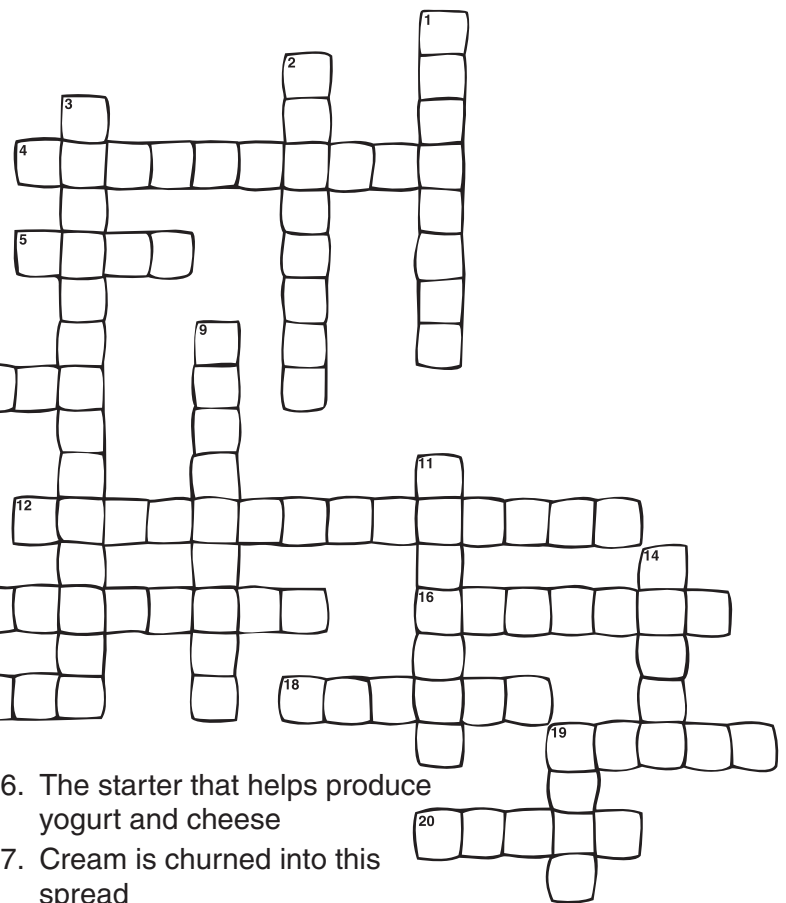
Confused by whole, reduced-fat, low-fat and fat-free? These labels on milk cartons tell you how much fat is in the milk. Whole milk, as it comes from the cow, is usually about 3.25% fat naturally. That means if the milk was not homogenized and the fat or cream could rise to the top, 3.25% of the total amount of milk you poured would be cream. That's about 1 1/2 tablespoons of cream in each 8-ounce glass of milk.

Reduced-fat milk has 2% fat, low-fat milk has just 1% fat left in it and fat-free milk has no fat. All milk – whole or fat-free, flavored or white – contains the same amount of important vitamins and minerals.

Crossword Puzzle

Across

4. Italian cheese used on pizza
5. Female cattle that produce milk
10. The black and white breed of dairy cattle
12. Heating to 161 degrees F for 15 seconds to kill bacteria
13. The grains eaten by livestock
15. Milk that is fat free
16. A popular cheese originally from England
17. A nutrient in dairy products that helps build strong muscles
18. A custard-like dairy product that often has fruit added
19. The solids that are made into cheese
20. Male cattle



Down

1. Added to drinking milk to help calcium build strong bones and teeth
2. A frozen dairy dessert
3. A process that breaks milk's butterfat particles
6. The starter that helps produce yogurt and cheese
7. Cream is churned into this spread
8. The liquid part when cheese is made
9. Milk with its natural fat
11. A nutrient in dairy products that helps build strong bones and teeth
14. A cow drinks lots of this each day
19. A young cow or bull

A Four-Part Stomach

Cows are ruminants, which means they're one of the animals with a four-part stomach. That's why they can digest coarse feeds like hay that other animals and people can't eat. It's also why they can swallow their food quickly without chewing it well.

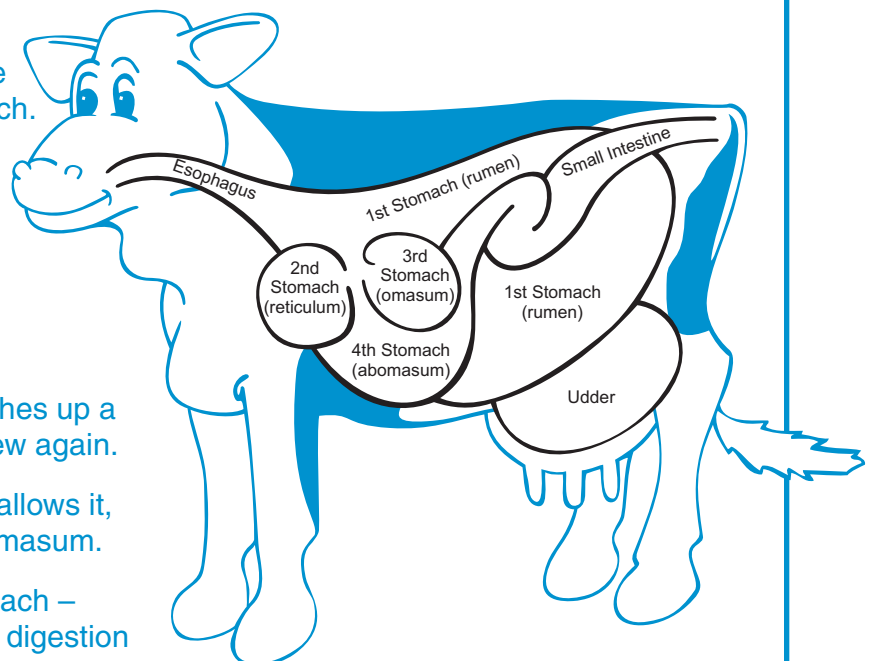
The food goes into the first and second stomachs – the rumen and reticulum.

When the cow has eaten her fill, she belches up a small amount of food, called a cud, to chew again.

After chewing her cud thoroughly, she swallows it, and it goes into the third stomach – the omasum.

From there it moves on to the fourth stomach – the abomasum – the true stomach where digestion actually occurs.

Can you trace the path through all the stomachs?



North Dakota
Agriculture
in the
Classroom



Take this
issue of
North
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Ag Mag
home to
share what
you've learned
about dairy.

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Fruit Cow

1 cup yogurt
1 cup milk
1 cup fruit (banana slices, berries, your choice!)

Put ingredients in a blender. Blend until smooth
and creamy. Pour into a tall glass and drink up!